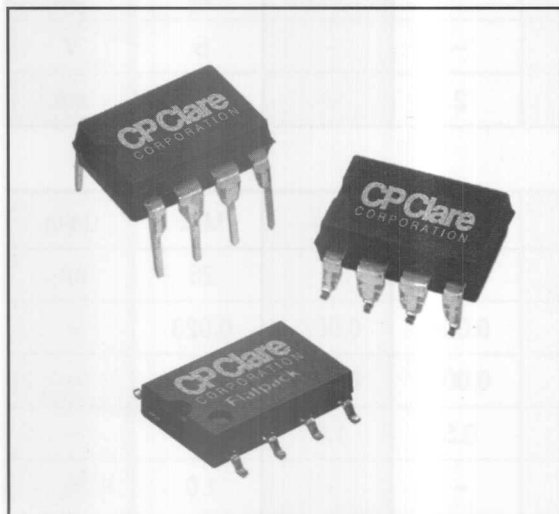


LOC110

Linear Optocoupler



DESCRIPTION

CP Clare's LOC110 Linear Optocouplers feature an infra-red LED optically coupled with two phototransistors. One feedback phototransistor is used to generate a control signal that provides a servomechanism to the LED drive current thus compensating for the LED's nonlinear time and temperature characteristics. The other (output) phototransistor provides an output signal that is linear with respect to the servo LED current.

FEATURES

- Small 8 Pin DIP Package
- Couples Analog and Digital Signals
- Wide Bandwidth (>200KHz)
- High Gain Stability
- Low Input/Output Capacitance
- Low Power Consumption
- 5000 V_{RMS} Input/Output Isolation Available
- 0.01% Servo Linearity
- THD 87 dB Typical
- UL Recognized: File Number E76270
- BSI Certified to BS415:1990 Certificate Numbers 7691 & 7693 (Flatpack Version)
- BSI Certified to BS EN60950:1992 (BS7002:1992) Certificate Numbers 7692 & 7694 (Flatpack Version)
- Complies with the Applicable Requirements of EN 41003:1993

APPLICATIONS

- Digital Telephone Isolation
- Power Supply Feedback Voltage/Current
- Medical Sensor Isolation
- Audio Signal Interfacing
- Isolate Process Control Transducers
- Modem Transformer Replacement With No Insertion Loss

RATINGS (@ 25°C)

Parameter	Min	Typ	Max	Units
Input Power Dissipation	—	—	150	mW
Input Control Current	—	—	100 ¹	mA
Peak (10mSec)	—	—	1	A
Total Package Dissipation	—	—	500 ²	mW
Isolation Voltage ³				
Input to Output	2500	—	—	V _{RMS}
"E" Suffix (optional)	3750	—	—	V _{RMS}
"G" Suffix (optional)	5000	—	—	V _{RMS}
Operational Temperature	-40	—	85	°C
Storage Temperature	-40	—	125	°C
Soldering Temperature (10 seconds Max)	—	—	260	°C

¹ Derate Linearly 1.33 mW/°C.

² Derate Linearly 6.67 mW/°C.

³ 2 Second Duration

For additional LOC110 information ask for our LOC110 Application Note No. 15001.
 For detailed information on CP Clare Solid State Products ask for our Catalog "SSP15".

Input Characteristics @ 25°C

Parameters	Conditions	Symbol	Min	Typ	Max	Units
LED Current to Operate		I_F	—	1	2	mA
LED Voltage Drop	$I_R = 10\text{mA}$	V_F	0.9	1.2	1.4	V
LED Drop-Out Voltage		$V_{F(OFF)}$	0.8	—	—	V
Input/Output Capacitance		$C_{I/O}$	—	3	—	pF
Reverse LED Current	$V_R = 5\text{V}$	I_R	—	—	10	μA
Reverse LED Voltage		V_R	—	—	5	V
Forward LED Current		I_F	2	—	100	mA

Coupler/Detector Characteristics @ 25°C

Parameters	Conditions	Symbol	Min	Typ	Max	Units
Dark Current	$I_F = 0\text{mA}$, $V_{CC} = 15\text{V}$	I_D	—	1	25	nA
K1, Servo Gain (I_1/I_F)	$I_F = 10\text{mA}$, $V_{CC} = 15\text{V}$	K1	0.004	0.007	0.020	—
K2, Forward Gain (I_2/I_F)	$I_F = 10\text{mA}$, $V_{CC} = 15\text{V}$	K2	0.004	0.007	0.020	—
K3, Transfer Gain (K_2/K_1)	$I_F = 10\text{mA}$, $V_{CC} = 15\text{V}$	K3	0.5	1.0	1.43	—
$\Delta K3$, Transfer Gain Linearity (non-servoed)	$I_F = 2 - 10\text{mA}$	$\Delta K3$	—	—	1.0	%
K3 Temperature Coefficient	$I_F = 10\text{mA}$, $V_{det} = -5\text{V}$	$\Delta K3/\Delta T$	—	0.005	—	%/°C
Common Mode Rejection Ratio	$V = 20\text{Vp-p}$, $R_L = 2\text{K}$, $F = 100\text{Hz}$	CMRR	—	130	—	dB
Input/Output Isolation		I/O	2500	—	—	V_{RMS}
"E" Suffix (optional)			3750	—	—	V_{RMS}
Total Harmonic Distortion	$F_o = 350\text{Hz}$	THD	80	87	96	dB
Frequency Response	Photoconductive Operation	BW (-3dB)		200		KHz
	Photovoltaic Operation	BW (-3dB)		40		KHz

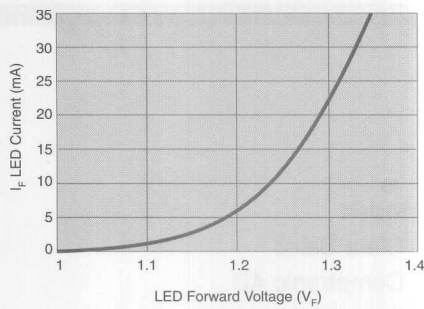
K3 Sorted Bins

Bin A	=	0.550	—	0.605
Bin B	=	0.606	—	0.667
Bin C	=	0.668	—	0.732
Bin D	=	0.733	—	0.805
Bin E	=	0.806	—	0.886
Bin F	=	0.887	—	0.974
Bin G	=	0.975	—	1.072
Bin H	=	1.073	—	1.179
Bin I	=	1.180	—	1.297
Bin J	=	1.298	—	1.426

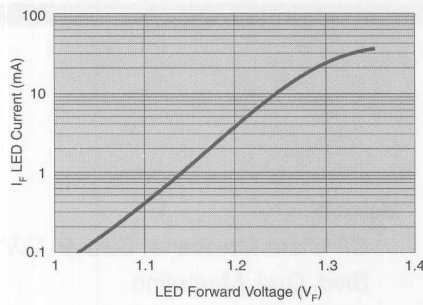
- The LOC110 is shipped in antistatic tubes of 50 pieces. Each tube will contain one K3 sorted bin.
- Bin designation marked on each device (A-J).
- Orders for the LOC110 product will be shipped using the bins available at the date of the order. Any bin (A-J) can be shipped.
- For customers requiring selected bins we offer bins D E F G

For additional LOC110 information ask for our LOC110 Application Note No. 15001.
 For detailed information on CP Clare Solid State Products ask for our Catalog "SSP15".

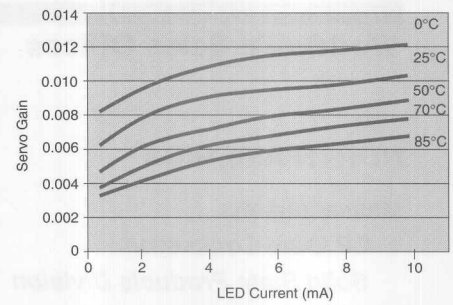
1) LED Forward Current (I_F) vs. Forward Voltage (V_F)



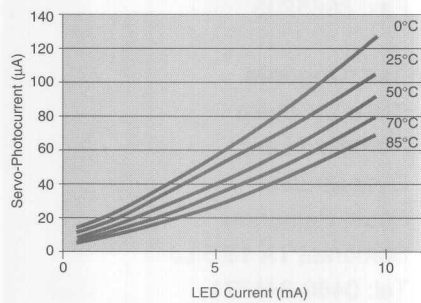
2) LED Forward Current (I_F) vs. Forward Voltage (V_F)



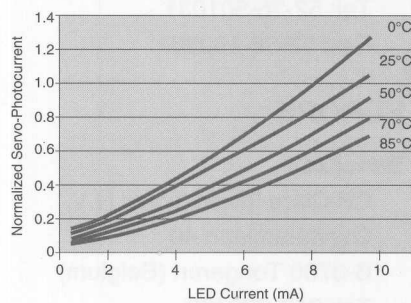
3) Servo Gain vs. LED Current & Temperature



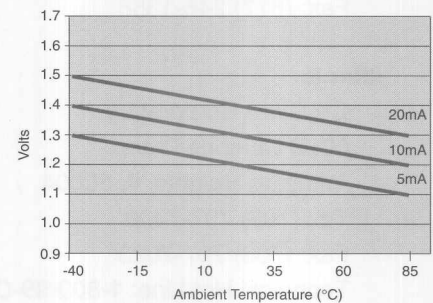
4) Servo-Photocurrent vs. LED Current & Temperature



5) Normalized Servo-Photocurrent vs. LED Current & Temperature

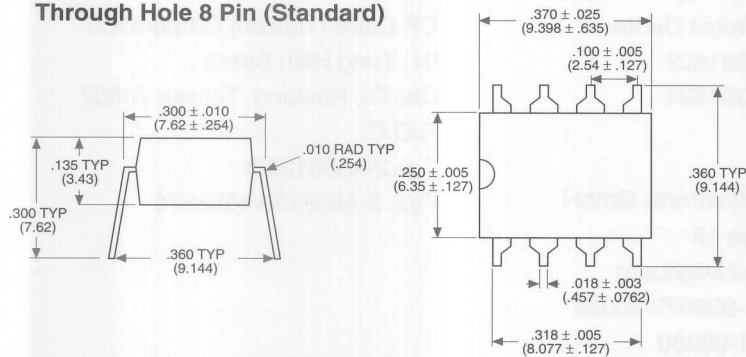


6) Typical Forward Voltage vs. Temperature V_F

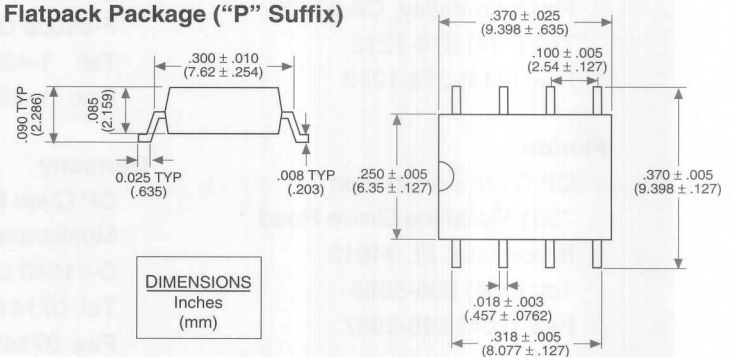


MECHANICAL DIMENSIONS

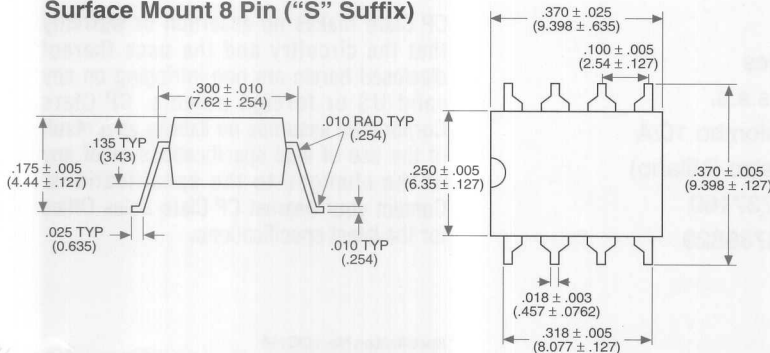
Through Hole 8 Pin (Standard)



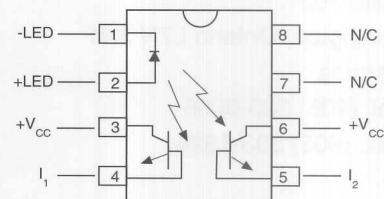
Flatpack Package ("P" Suffix)



Surface Mount 8 Pin ("S" Suffix)



PACKAGE PINOUT



Note: Pins 3 & 4 should not be used for the output phototransistor to comply with regulatory agency requirements.

For additional LOC110 information ask for our LOC110 Application Note No. 15001.
For detailed information on CP Clare Solid State Products ask for our Catalog "SSP15".

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